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(71) Applicant *(for all designated States except US)*: **THOMSON MULTIMEDIA** [FR/FR]; 46, quai Alphonse le Gallo, F-92100 Boulogne-Billancourt (FR).

(71) Applicant and
(72) Inventor: **BARON, René-Louis** [FR/FR]; Domaine de la Maison Blanche, F-45320 Saint-Hilaire les Andresis (FR).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **CAUVIN, Laurent** [FR/FR]; Le Coin Guillé, F-35250 Chevaigné (FR). **MORILLON, Gilles** [FR/FR]; Le Mesnil, F-35520 Melesse (FR).

(74) Agent: **KERBER, Thierry**; 46, quai Alphonse Le Gallo, F-92648 Boulogne-Billancourt (FR).

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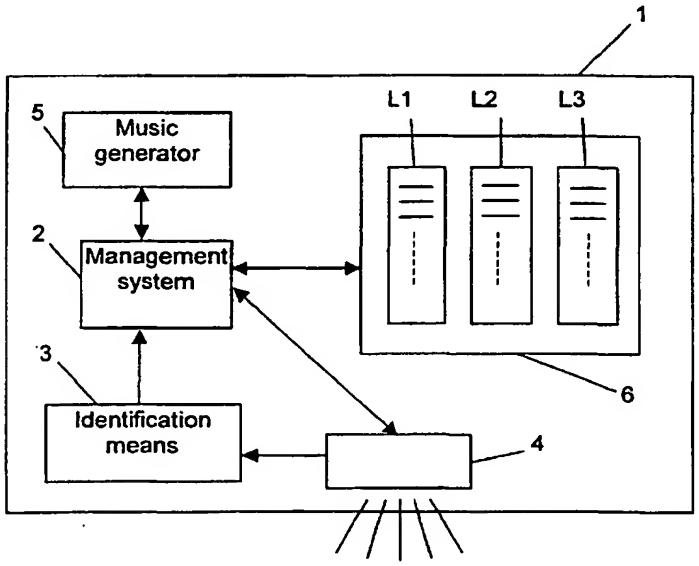
(54) Title: DATA COMMUNICATIONS SERVER SUPPLYING RINGING TONES, AND ASSOCIATED METHOD OF ALLOCATING RINGING TONES



(57) Abstract: The present invention relates to a data communications server (1) capable of supplying ringing tones to receivers, as well as a corresponding method of allocating ringing tones. The server comprises a system (2) for managing at least one list of available ringing tones which are associated respectively with at least one set of receivers, and a user interface (4). The list-management system is capable of updating each of the lists by eliminating at least the ringing tones already supplied to receivers of the set associated with this list. Advantageously, the server comprises a generator (5) of musical ringing tones and/or the management system stores lists of unavailable ringing tones in a memory (6), these lists corresponding to the ringing tones already supplied.

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Data communications server supplying ringing tones, and associated method of allocating ringing tones

The present invention relates to a data-communications server and to a method of selecting telecommunications ringing tones, preferably telephone ringing tones.

Telephone ringing tones form part of our daily life and have experienced a new growth with the increasing use of portable telephones. Fairly often, however, the ringing tones which are available to us and which surround us are uniform ringing tones, belonging to a few standard types. That being so, the choice for the users is generally fairly limited.

One drawback of this situation is that, fairly often, when a portable telephone rings, several persons react as if it was theirs, before realizing their error. This uncertainty also exists for static telephones, for example in open-plan offices; whenever employees moves away from their position, and when they hear a ringing tone, they have to pay the greatest attention, and most often return hastily to their position, in order to discover whether it does or does not concern them.

Another drawback of this restriction in the choice of ringing tones offered is uniformity imposed on the users, instead of a diversified choice being available to them.

Several solutions have already been developed in order to remedy these problems and to enrich the range of telephone ringing tones offered. In particular, known systems propose to the users that they com-

pose their own telephone ringing tone. However, these systems require knowledge of music and of programming operations, which prove to be complex for users seeking to obtain a ringing tone which is original and agreeable to the ear.

Other systems propose to the users that they select ringing tones of their choice from catalogues.

Thus, the patent US-4,868,561 discloses a method of selecting an alert pattern for a pocket receiver or "pager receiver", which is applicable to telephone ringing tones. A user calls a terminal, by telephone, for pocket receivers or "pager terminals", which offers him a selection of an alert pattern from a predetermined list. Once the choice has been made, the pager terminal transmits a signal to the pager receiver for replacing the alert pattern, which prepares a reprogramming of a reprogrammable memory in the pager receiver. Then the new alert pattern, selected by the user, is programmed into this memory.

Furthermore, the document EP-0,851,649 describes a method of programming a telephone ringing tone, in which a ringing tone is converted into characters containing specifications of notes, and the characters are sent to a telephone, for example in a short message. In the telephone, the characters received are modified into a form making it possible to store them in a memory. The ringing tone is then reproduced by sound-reproduction means in response to an incoming call. This technique makes it possible to offer ringing tones to a user, who may or may not accept them, including ringing tones originating from another user via the Internet.

Such methods considerably enrich the options offered to the users, while providing them, with no ef-

fort on their part, with ringing tones which are agreeable to the ear. However, they unavoidably lead to several users choosing identical ringing tones, all the more so since the effects of fashion generally lead the consumers to favour a somewhat restricted number of options, from among a large number of offerings of similar products (in this instance, telephone ringing tones).

The document WO-00/17850 for its part discloses a device for automatic musical generation applicable to the monitoring of musical, incoming-call tones which are customized by the called party, this device possibly being situated on a data communications server linked to the telephone network (p. 26, l. 14-20).

This embodiment resolves the above-mentioned drawbacks to a large extent, since it makes it possible to generate a practically unlimited number of separate musical telephone ringing tones, without any effort by the user. However, the choosing of a satisfactory ringing tone risks being a lengthy matter, when the ringing tones are generated in a completely random way. The users, not finding any ringing tone to their taste after a large number of attempts, even run the risk of giving up trying to find a ringing tone which is truly to their taste.

One solution would consist in letting the users themselves determine some of the musical-composition parameters, which would allow them to target the ringing tone generated. However, given that the number of parameters which it is possible to choose is sufficient to give them satisfaction, the ringing tones generated by several persons risk being very similar, if not identical, for the same reasons as those set out above

in connection with the selection from a predetermined list.

The present invention relates to a data communications server capable of supplying telecommunications ringing tones to telephone receivers, which makes it possible to avoid several receivers having identical or very similar ringing tones.

The invention allows this diversity, while enabling the use of ringing tones which are agreeable to the ear, corresponding to the taste of the user. It may also allow the latter a very simple selection of a ringing tone which suits him or her, without any complex operations.

The invention also relates to a method of selecting telecommunications ringing tones, having the advantages cited above.

It applies in particular to the field of telephony, that is to say of telecommunication established with a view to transmission of speech, for portable or static telephones. It may also be used, for example, for alert patterns of pager receivers or of remote alarm systems.

To that end, the subject of the invention is a data communications server capable of supplying telecommunications ringing tones, by downloading, to telecommunications receivers, preferably telephone receivers. The server comprises a system for managing one or more lists of ringing tones which are available for the receivers and a user interface allowing the server to communicate with the receivers.

According to the invention, with the lists being associated respectively with sets of receivers, the list-management system is capable of updating each of the lists by eliminating at least the ringing tones al-

ready supplied to receivers of the set associated with this list.

Thus, the invention is based on the use of lists of available ringing tones, as in certain known systems. On the other hand, in contrast to the existing techniques, the ringing tones are eliminated from the lists as and when they are selected by the users. This avoids any one ringing tone being supplied several times over, which makes it possible, in a centralized way, to ensure the diversity of the ringing tones used.

Moreover, the use of lists may present the usual advantages of this type of method, that is, in particular, to say the possibility, if appropriate, of offering a diversified choice, of supplying agreeable and coherent ringing tones and of allowing users to obtain such a ringing tone for themselves in a simple way.

The server of the invention may allow a one-to-one allocation of a ringing tone per receiver, provided that the number of ringing tones available is sufficiently high. In such an implementation, nobody else in the world can have a ringing tone identical to one's own.

In other embodiments, the one-to-one distribution is carried out within sets of receivers; for each set, any ringing tone already allocated is eliminated. In this case, one list is provided per set. This implementation makes it possible to multiply the number of ringing tones available, having regard to the low probability that different categories of users will hear the ringing tones of the other categories. For example, the downloading of identical ringing tones is authorized to static telephones which are spaced apart from

one another, by dividing up the geographical space for allocating ringing tones into several zones.

In a first form of elimination of ringing tones supplied, the list-management system is designed to eliminate, from each of the lists, at least every ringing tone already supplied to any one of the receivers of the set associated with this list. For each set of receivers, two separate receivers then necessarily have a different ringing tone.

In a second form of elimination of the ringing tones supplied, the data communications server is capable also of supplying ringing tones to groups of receivers. The list-management system is then designed to eliminate from each of the lists at least any ringing tone already supplied to any one of the groups of receivers including at least one receiver of the set associated with this list. This implementation allows the allocation of a single ringing tone to several receivers, even if they belong to the same set. These receivers, however, have to be defined as forming part of the same group.

In one advantageous implementation of this last embodiment, a user has the option of communicating to the server the particulars (for example the telephone numbers) of several receivers, when he or she issues a request to obtain a ringing tone. The selected ringing tone is then offered to all the designated receivers, which may or may not accept it. All the receivers accepting this ringing tone then constitute one group. This functionality is preferably implemented on an Internet server.

In other advantageous embodiments, which may be combined with the foregoing ones, the list-management system is designed to update each of the lists by

eliminating classes of ringing tones comprising the ringing tones already supplied to receivers of the set associated with this list. Thus, for each ringing tone allocated in a given set, it is not enough to delete this ringing tone from the list of the available ringing tones, but also other ringing tones forming part of the same class.

This embodiment is beneficial, since it makes it possible to eliminate ringing tones which are very similar to the ear, which otherwise would risk being confused. The presence of resemblances in the lists of ringing tones available is useful, since it enables a wider choice for the users. Being able to take account of classes of ringing tones instead of individual ringing tones is also advantageous in cases where the available ringing tones are defined by means of parameters, capable of taking a very large number (or even an infinite number) of values. For each ringing tone allocated with given values of the parameters, it is then possible, for example, to exclude all the ringing tones having values of the parameters lying within narrow ranges around these given values.

In a first form of ringing tones supplied, these are single-channel tones, of the type obtained by a simple buzzer. In a second form, they are multi-channel tones, several musical channels being intended to play simultaneously.

The lists of ringing tones defined above may be obtained directly, in the form of "positive" lists explicitly indicating the ringing tones available, or indirectly, in the form of "negative" lists, indicating, in contrast, the unavailable ringing tones.

Thus, advantageously, the list-management system is intended to store, in at least one memory of the

server for at least one of the sets of receivers, respectively at least one list of unavailable ringing tones. The management system then implicitly updates the list of available ringing tones which is associated with this set by updating this list of unavailable ringing tones.

In practice, preferably, the lists of available ringing tones are not explicitly determined on the basis of unavailable ringing tones. This embodiment is advantageous, in effect, when a very large number, or even an unlimited number, of ringing tones can be offered. In this case, upon each application by a user, the management system verifies, in the memory, that the ringing tones already allocated are excluded from the offerings made.

The system for managing the lists of available ringing tones is preferably designed to reintegrate into these lists the ringing tones which have been previously allocated and which cease to be used. Such circumstances come about, for example, when users discontinue their subscription or change ringing tone. According to one appropriate embodiment, any ringing tone allocated is kept in a memory which is accessible to the server (preferably in the server), with an indicator of the corresponding receiver or receivers. The management system is then capable of finding the already allocated ringing tones again in the memory. According to another embodiment, only the indicators are kept in memory and not the ringing tones allocated. The server is then provided with means for recovering ringing tones from receivers, so as to be able to reintegrate them into the available ringing tones. In yet another embodiment, only the one-to-one identifiers of the ringing tones allocated are kept in memory.

The available ringing tones are preferably stored in a memory of the server.

In one preferred mode of allocating the ringing tones, the user interface is capable of proposing to the receivers, for selection, a plurality of ringing tones from the lists of the available ringing tones, and is designed to communicate, to the means for identification of the ringing tones supplied, the ringing tones selected by the receivers. The users can then intervene directly and interactively in the choice of the ringing tone, which offers them a capability for customization.

According to a first form of this preferred allocation mode, the user interface in operation makes available to each of the receivers at the same time all of the ringing tones available for the set to which this receiver belongs. The users can then look up the corresponding list of available ringing tones, like a catalogue. According to a second form, the user interface makes available only some of the ringing tones of this list, the others not being able to be allocated to the user in question. For example, a certain type of ringing tones is reserved for business news. According to a third form, the user interface does not prevent access to any of the available ringing tones, but allows only sequential access; the ringing tones are offered one after another, according to a mode which is monitored by the data communications server.

In one advantageous form for selection of ringing tones, the user interface is capable of proposing the lists of available ringing tones to the receivers in the form of a tree structure. Selection can therefore be easier and more agreeable than a selection proposed in linear form.

In another mode of allocation of ringing tones, the user interface automatically allocates a ringing tone to each receiver submitting a request. This embodiment, simpler and quicker than the preceding one, nevertheless deprives the users of their prerogative of customization.

The various forms for allocating ringing tones are advantageously combined. For example, the server is designed to allow a company to select a certain type of ringing tones for all the static instruments of a site. The ringing tones are then allocated automatically, in the chosen type, to those various instruments.

According to a first mode for proposing ringing tones, the user interface is intended to send the proposed ringing tones directly to the telecommunications receivers, by which the ringing tones are played. In a second mode for proposing ringing tones, the user interface is designed to send the proposed ringing tones to listening stations, and to send only selected ringing tones to the receivers. These listening stations are advantageously computers connected to a messaging network, such as the Internet.

The data communications server preferably comprises a device for dynamically enlarging the lists of available ringing tones.

By "dynamically enlarging the lists" is understood that the lists are not fixed, but that they can be enhanced by new contributions.

Thus, according to one particular embodiment of the dynamic-expansion device, the latter is intended regularly to receive new ringing tones, specially composed for this purpose. The available ringing tones may, for example, be adapted on the basis of fashion, of new musical forms or of the creativity of special-

ized composers. The list-management system ascertains, upon each introduction of new ringing tones into the lists of available ringing tones, that these new ringing tones have never been present in these lists. To do that, the server advantageously comprises means for access to a memory (preferably in the server) which is intended to store all the ringing tones eliminated from the lists of available ringing tones, that is to say those already allocated.

In another embodiment of the dynamic-expansion device, the device for dynamic expansion of the lists of available ringing tones includes a generator of musical ringing tones.

Thus, according to a form which is particularly adapted to telephone receivers, the musical-ringing-tones generator is intended to produce music in which the number of notes is equal to the number of digits of the telephone number and in which each note has a pitch associated with the corresponding digit. The one-to-one allocation of music per telephone number is ensured by the singularity of each number. This embodiment has the merit of its great simplicity, but the user has no choice, or a very restricted choice, bearing on the way of playing the melody thus formed (durations, harmonies). Moreover, the musical ringing tones obtained often run the risk of being hardly agreeable to the ear.

In one preferred embodiment of the musical-ringing-tones generator, the latter is in accordance with the disclosure of the document WO-00/17850. Thus the ringing-tone generator preferably includes:

- a means of defining musical sequences in the course of which at least four notes are capable of being played,

- a means of defining two families of note pitches, for each musical sequence, the second family of note pitches possessing at least one note pitch which is not in the first family of note pitches,

- a means of making up at least one succession of notes possessing at least two notes, each succession of notes being called a musical phrase, in which succession, for each sequence, each note the pitch of which belongs exclusively to the second family is surrounded exclusively by notes from the first family, and

- a means of outputting a signal representative of each note pitch of each said succession.

By virtue of these provisions, the succession of note pitches possesses both great richness, since the number of successions capable of being generated in this way is several billions, and a harmonic coherence, because the polyphony generated is governed by constraints.

According to particular characteristics, the means of defining two families of note pitches is configured, for each musical sequence, to define the first family as being a set of note pitches belonging to a harmony duplicated from octave to octave.

According to other particular characteristics, the means of defining two families of note pitches is configured to define the second family of note pitches so that it includes at least the note pitches of a scale which are not in the first family of note pitches.

By virtue of these provisions, the definition of the families is easy and the alternation of notes from the two families is harmonious.

According to other particular characteristics, the means of making up at least one succession of notes

possessing at least two notes is configured so that each musical phrase is defined as a set of notes the start instants of which are not separated from each other, two by two, by more than a predetermined duration.

By virtue of these provisions, a musical phrase is, for example, made up of notes the start instants of which are not separated by more than three semiquavers.

For preference, at least one of the means of defining musical sequences, of defining two families of note pitches and of making up at least one succession of notes is based on the value of parameters. Advantageously, the parameters are then partly determined by a user during the selection of a ringing tone from the list of the available ringing tones, and partly chosen at random by the musical-ringing-tones generator. For example, the user chooses the musical style (waltz, tango, country, etc), the duration and the speed of performance, and the musical-ringing-tones generator produces a ringing tone by drawing the other parameters at random.

The invention also relates to a method of allocating telecommunications ringing tones to telecommunications receivers, preferably telephone receivers, from a data communications server. This method includes the management of at least one list of ringing tones available to the receivers.

According to the invention, with the lists being associated with sets of receivers, from each of these lists, at least the ringing tones which are downloaded to receivers of the set associated with this list are eliminated.

The invention will be better understood and illustrated by means of the following embodiment and im-

plementation examples, which are not in any way limiting, by reference to the attached figures on which:

- Figure 1 is a theoretical diagram of the communication between a data communications server in accordance with the first embodiment of the invention and receivers;

- Figure 2 shows, in block diagram form, the principal elements of the server of Figure 1;

- Figure 3 illustrates successive stages implemented by means of the server of Figures 1 and 2 during communications with receivers for allocating ringing tones;

- Figure 4 shows a tree structure for a choice proposed to a user during the selection of a ringing tone by means of the server of Figures 1 and 2;

- Figure 5 is a theoretical diagram of the communication between a data communications server in accordance with a second embodiment of the invention, on the one hand, and a group of receivers and one receiver, on the other hand;

- Figure 6 represents a flow chart for automatic musical generation, implemented for the generation of ringing tones by means of servers of the first and second embodiment (Figures 1 to 5);

- and Figure 7 shows, in block diagram form, a musical-ringing-tones generator which can be used in the servers of the first and second embodiment and allowing automatic generation in accordance with Figure 6.

A data communications server 1 (Figure 1) hosted by a GSM or wire-based provider is designed to supply ringing tones S1, S2, ..., Sn respectively to receivers R1, R2 ... Rn, upon requests Q1, Q2 ... Qn

("Q" for "query") from these receivers Ri. The receivers Ri are portable or static telephones.

The server 1 (Figure 2) comprises a module 4 for communicating from the server 1 with receivers Ri, designed especially to receive the requests Qi originating from the receivers Ri, offering ringing tones to these latter, being informed of the selections made by the users for their receivers Ri and transmitting the selected ringing tones Si to the receivers Ri. Means 3 for identification of the ringing tones supplied take note of the ringing tones thus downloaded.

In a variant, the module 4 is designed to download the ringing tones offered to terminals of a network, such as the Internet, these terminals being associated respectively with the receivers Ri. The ringing tones are then played by these terminals and only the ringing tones selected by the users are transmitted to the receivers Ri.

The server 1 also comprises a musical-ringing-tones generator 5 capable of composing a very large number of ringing tones. Such a generator 5 is described in the international application WO-00/17850 and will be described below. The communications module 4 is linked to this generator 5, so as to offer composed ringing tones to each user so requesting, until one of the ringing tones is ratified by this user.

A system 2 for managing lists L1, L2 and L3 of unavailable ringing tones makes it possible to track the ringing tones Si already allocated to receivers Ri. Each of the lists L1, L2 and L3, which are stored in a memory 6, is associated with a predetermined set of receivers Ri, for example all the static telephone receivers of a given region (the indexing being obtained simply by means of the first digits of the telephone

number). The management system 2 has the particular function of ensuring that the ringing tones allocated to the receivers Ri of each of the sets are all distinct from one another; two users of the same set never have the same ringing tone Si.

The lists L1, L2 and L3 comprise identifiers of the complete ringing tones. In one variant embodiment, they comprise parameters representing ringing tones or classes of ringing tones, which simplifies management.

In operation (Figure 3), a user makes connection (stage 11) and sends the server 1 a request Di (stage 12) for modification or allocation of ringing tone for a receiver Ri. This operation is carried out, for example, by dialling a dedicated telephone number. The server 1 then authorizes this user (stage 13) to look up available ringing tones, that is to say ringing tones not already allocated for the set to which the receiver Ri belongs. By way of illustration, it is considered below that this set is associated with the list L1. The look-up can be purely acoustic, the ringing tones being broadcast to the receiver Ri until approval by the user.

Each of the available ringing tones is composed by the generator 5 and is subjected to a check beforehand by the management system 2 before being sent to the user: the management system 2 compares the ringing tone composed with all the unavailable ringing tones of the relevant list (here: L1) and allows the transmission of the ringing tone composed only if this comparison is fruitless. In the opposite case, the management system 2 requires the generator 5 to compose another ringing tone.

In the example set out, the ringing tones proposed are partially specified by means of selection pa-

rameters. The look-up is then done in tree structure 18 (Figure 4). Thus, the communications module 4 of the server 1 successively offers the user various choices bearing on these selection parameters, for example by voice command. At each proposal, the user chooses the value of the parameter which suits him or her, for example by pressing on a dialler key of the receiver Ri. He or she thus descends implicitly different levels Nj into the tree structure 18, until all the selection parameters provided have been determined. The communications module 4 then applies to the generator 5 for a musical ringing tone meeting the selected criteria to be composed, receives this ringing tone originating from the generator 5 and communicates it to the user.

Only some of the ringing-tone composition parameters can be controlled by the user, while other parameters are determined randomly by the generator 5. In that way, numerous musical ringing tones meeting the specifications desired can be proposed successively. The user, for example, chooses a ringing tone:

- of classical, blues, festive, futuristic, latin, jazz, etc., style (level N1);
- cheerful or sad (level N2);
- slow or fast (level N3);
- and short or long (level N4).

The user listens successively to the ringing tones proposed, until he or she sends the communications module 4 a ratification command, which expresses the selection of the desired ringing tone (stage 14). The module 4 then carries out the downloading of this ringing tone Si to the receiver Ri (stage 15). In parallel, the identification means 3 transmit, to the management system 2, the information on the ringing tone Si downloaded, and the management system writes this

ringing tone Si into the list L1 of the unavailable ringing tones (stage 16).

When the receiver Ri issuing the request Di already has a previously allocated ringing tone and decides to change it, the communications module 4 first of all interrogates the receiver Ri in order to obtain this ringing tone or a unique identifier of this ringing tone. This is then uploaded to the module 4, identified by the identification means 3 and forwarded to the management system 2. It is compared by the latter with the ringing tones of the list in question (list 1), until its presence in the list is identified. Then it is deleted from the list (thus made available).

In one variant implementation, the lists comprise not the musical ringing tones themselves, nor the parameters defining them in a one-to-one way, but parameters of classes partially defining them. These parameters of classes especially comprise the selection parameters. The lists of unavailable ringing tones L1, L2 and L3 thus comprise classes respectively including the ringing tones already downloaded, as well as other similar ringing tones. For example, one of the random parameters has a value determined in a continuous range. The management system 2 then writes, into the lists L1, L2 and L3, lower and higher values defining intervals centred on these random values. This provision makes it possible to avoid very similar ringing tones Si being allocated to separate receivers Ri of the same list.

In another embodiment of a data communications server, referenced 10 (Figure 5), the server 10 is capable of supplying ringing tones Si not only to individual receivers Ri (receiver R1 in Figure 5), but also to groups of receivers, such as the group G of receiv-

ers R1_G, R2_G... Rm_G. The same ringing tone S0 is thus allocated to all the receivers Rj-G of the group G, for example upon request D0 from one of the receivers R1_G of the group G. It is thus made possible to adopt an identical ringing tone for a family or a group of friends.

The server 10 is similar to the server 1 and differs from it essentially in that its communications module is designed to download the selected ringing tone to all the receivers Rj_G of the group G in question, and in that its management system, in operation, adds the selected ringing tone to all the lists of unavailable ringing tones associated with at least one receiver of the group G.

One advantageous embodiment of a musical-ringing-tones generator 5 will now be explained, by reference to Figures 6 and 7. Detailed procedures are set out in the international application WO-00/17850.

Figure 6 diagrammatically represents a flow chart for automatic musical generation used for the generator 5.

After the start 11, musical sequences are defined in the course of an operation 12. For example, a fragment of music is then defined, including bars, each bar including beats, each beat including note placements. In this example, the operation 12 consists in allocating a number of bars to the fragment of music, a number of beats to each bar and a number of note placements to each beat, or a minimum note duration. Each musical sequence is defined here in such a way that at least four notes are capable of being played over its duration.

Next, in the course of an operation 14, two families of note pitches are defined for each musical

sequence, the second family of note pitches possessing at least one note pitch which is not in the first family. For example, a scale and a harmony are allocated to each half-bar of the fragment of music, the first family including the note pitches of this harmony, duplicated from octave to octave, and the second family including at least the note pitches of the scale which are not in the first family. It is observed that different musical sequences or consecutive musical sequences may have the same families of note pitches.

Then, in the course of an operation 16, at least one succession of notes possessing at least two notes is made up, with, for each sequence, each note the pitch of which belongs exclusively to the second family being surrounded exclusively by notes from the first family. For example, a succession of notes is defined as being a set of notes the start instants of which are not separated from each other, two by two, by more than a predetermined duration. Hence, in the example explained with the operation 14, for each half-bar, a succession of notes does not possess two consecutive note pitches which are exclusively in the second family of note pitches.

In the course of an operation 18, a signal representative of the note pitches of each succession is issued. This signal is, for example, forwarded to the communications module 4. The musical generation then stops at operation 20.

Figure 7 represents, in block-diagram form, an embodiment of the musical-ringing-tones generator 5. In this embodiment, the generator 5 includes, linked together by at least one signal line 40, a generator of families of note pitches 32, a generator of musical sequences 34, a generator of musical phrases 36 and an

output port 38. The output port 38 is linked to an external signal line 42.

The signal line 40 is a line capable of transporting a message or a piece of information. For example, it is an electrical or optical conductor of known type. The musical-sequence generator 34 defines musical sequences in such a way that, in the course of each musical sequence, four notes are capable of being played. For example, the musical-sequence generator 34 defines a fragment of music by way of a number of bars which it contains and, for each bar, a number of beats, and, for each beat, a number of possible note-start placements or a minimum note duration.

The generator of families of note pitches 32 defines two families of note pitches, for each musical sequence. The generator 32 defines the two families of note pitches in such a way that the second family of note pitches possesses at least one note pitch which is not in the first family of note pitches. For example, to each half-bar of the fragment of music, there are allocated a scale and a harmony, the first family including the note pitches of this harmony, duplicated from octave to octave, and the second family including at least the note pitches of the scale which are not in the first family. It is seen that different musical sequences or consecutive musical sequences can have the same families of note pitches.

The musical-phrase generator 36 generates at least one succession of notes possessing at least two notes, each succession being made up in such a way that, for each sequence, each note the pitch of which belongs exclusively to the second family is surrounded exclusively by notes from the first family. For example, a succession of notes is defined as being a set of

notes the start instants of which are not separated from each other, two by two, by more than a predetermined duration. Thus, in the example explained with the generator of families of note pitches 32, for each half-bar, a succession of notes does not possess two consecutive note pitches which are exclusively in the second family of note pitches.

The output port 38, by way of the external signal line 42, sends out a signal representative of the note pitches of each succession.

The musical-ringing-tones generator 5 includes, for example, a general-purpose computer programmed to implement the present technique, and a MIDI sound card linked to a bus of the computer. In another implementation, the generator 5 forwards the musical ringing tones in a purely software fashion, and therefore does not require a sound card.

CLAIMS

1. Data communications server (1,10) capable of supplying telecommunications ringing tones (Si), by downloading, to telecommunications receivers (Ri, Rj_G), preferably telephone receivers, the server (1,10) comprising a system (2) for managing at least one list of ringing tones which are available for the receivers (Ri, Rj_G) and a user interface (4) allowing the server (1,10) to communicate with the receivers (Ri, Rj_G), characterized in that, with the lists being associated respectively with at least one set of said receivers (Ri, Rj_G), the list-management system (2) is capable of updating each of said lists by eliminating at least the ringing tones (Si) already supplied to receivers (Ri, Rj_G) of the set associated with said list.

2. Data communications server (1) according to Claim 1, characterized in that the list-management system (2) is designed to eliminate, from each of the lists, at least every ringing tone already supplied to any one of said receivers (Ri) of the set associated with said list.

3. Data communications server (10) according to Claim 1, characterized in that the data communications server is capable also of supplying ringing tones (S0) to groups (G) of receivers (Rj_G), and in that the list-management system (2) is then designed to eliminate from each of the lists at least any ringing tone already supplied to any one of said groups of receivers (Rj_G) including at least one receiver (Rj_G) of the set associated with said list.

4. Data communications server (1, 10) according to any one of the preceding claims, character-

ized in that the list-management system (2) is designed to update each of said lists by eliminating classes of ringing tones comprising the ringing tones (Si) already supplied to receivers (Ri, Rj_G) of the set associated with said list.

5. Data communications server (1, 10) according to any one of the preceding claims, characterized in that the list-management system (2) is intended to store, in at least one memory (6) of the server (1, 10) for at least one of the sets of receivers (Ri, Rj_G), respectively at least one list (L1-L3) of unavailable ringing tones, the management system (2) implicitly updating the list of available ringing tones which is associated with said set by updating said list (L1-L3) of unavailable ringing tones.

6. Data communications server (1, 10) according to any one of the preceding claims, characterized in that the user interface (4) is capable of proposing to the receivers (Ri, Rj_G), for selection, a plurality of ringing tones (Si) from the lists of the available ringing tones, and is designed to communicate, to the means (3) for identification of the ringing tones supplied, the ringing tones (Si) selected by the receivers (Ri, Rj_G).

7. Data communications server (1, 10) according to Claim 6, characterized in that the user interface (4) is capable of proposing said lists of available ringing tones to the receivers (Ri, Rj_G) in the form of a tree structure (18).

8. Data communications server (1, 10) according to any one of the preceding claims, characterized in that it comprises a device for dynamically enlarging the lists of available ringing tones.

9. Data communications server (1, 10) according to Claim 8, characterized in that the device for dynamically enlarging the lists of available ringing tones comprises a musical-ringing-tones generator (5).

10. Data communications server (1, 10) according to Claim 9, characterized in that the musical-ringing-tones generator (5) includes:

- a means (34) of defining musical sequences in the course of which at least four notes are capable of being played,

- a means (32) of defining two families of note pitches, for each musical sequence, the second family of note pitches possessing at least one note pitch which is not in the first family of note pitches,

- a means (36) of making up at least one succession of notes possessing at least two notes, each succession of notes being called a musical phrase, in which succession, for each sequence, each note the pitch of which belongs exclusively to the second family is surrounded exclusively by notes from the first family, and

- a means (38) of outputting a signal representative of each note pitch of each said succession.

11. Data communications server (1, 10) according to Claim 10, characterized in that the means (32) of defining two families of note pitches is configured, for each musical sequence, to define the first family as being a set of note pitches belonging to a harmony duplicated from octave to octave.

12. Data communications server (1, 10) according to Claim 11, characterized in that the means (32) of defining two families of note pitches is configured to define the second family of note pitches so that it in-

cludes at least the note pitches of a scale which are not in the first family of note pitches.

13. Data communications server (1, 10) according to any one of Claims 10 to 12, characterized in that the means (36) of making up at least one succession of notes possessing at least two notes is configured so that each musical phrase is defined as a set of notes the start instants of which are not separated from each other, two by two, by more than a predetermined duration.

14. Method of allocating telecommunications ringing tones (Si) to telecommunications receivers (Ri, Rj_G), preferably telephone receivers, from a data communications server (1,10), the method including the management of at least one list of ringing tones available to the receivers, characterized in that, with said lists being associated with sets of said receivers (Ri, Rj_G), for each of these lists, at least the ringing tones (Si) of this list which are downloaded to receivers (Ri, Rj_G) of the set associated with this list are eliminated.

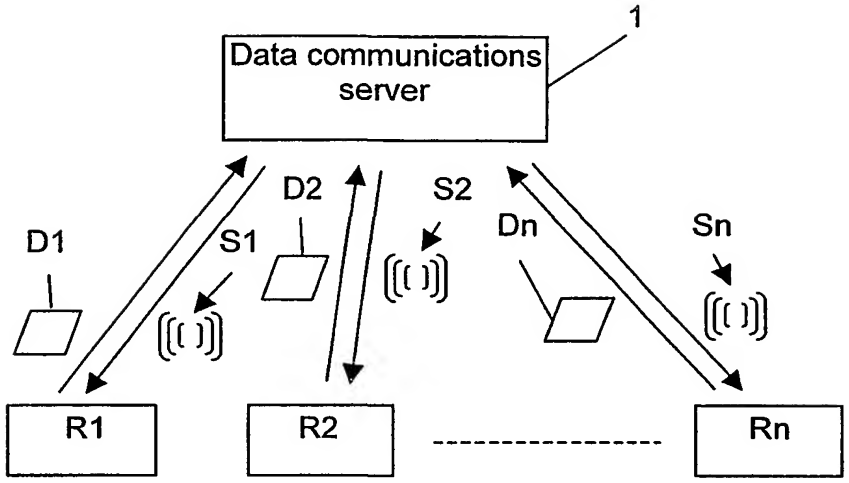

FIG. 1

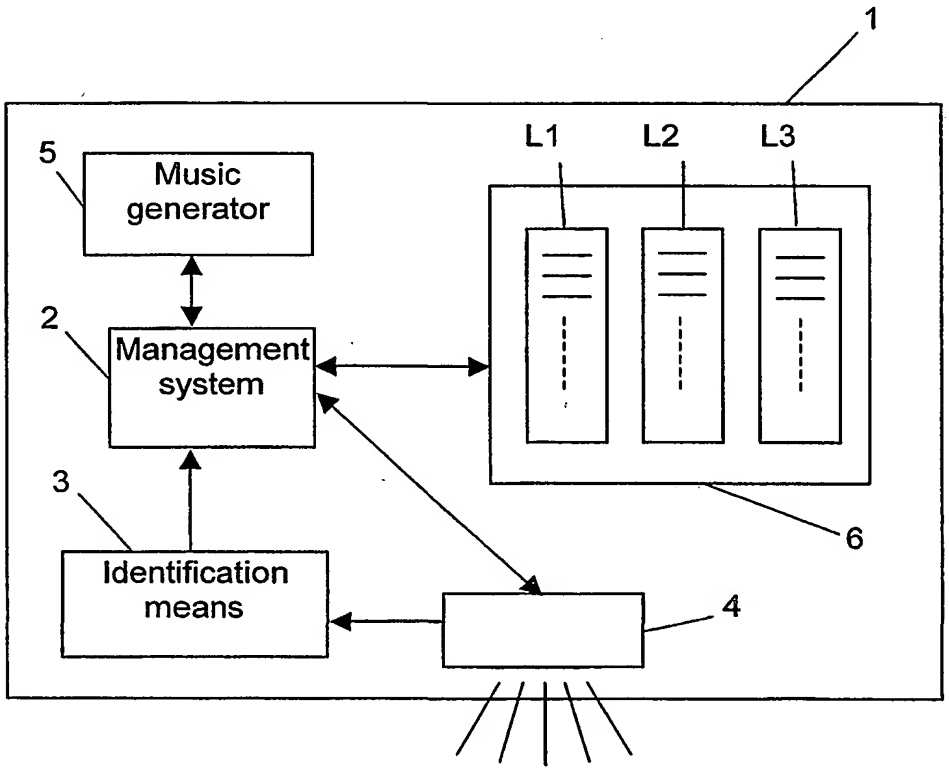

FIG. 2

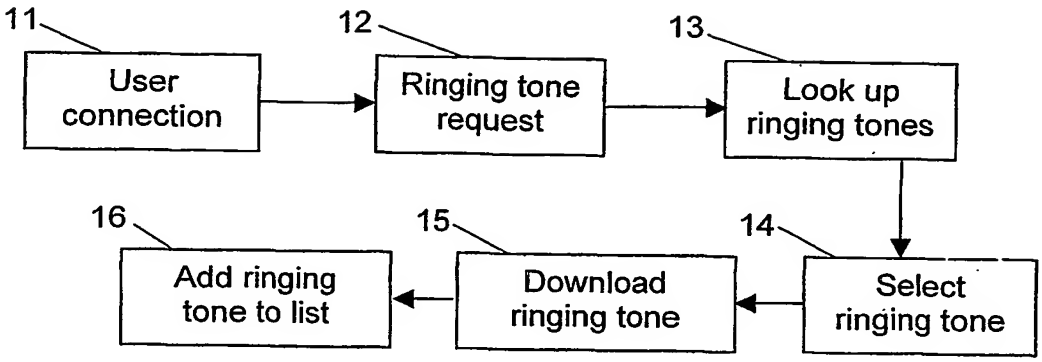
11
User connection
12
Ringing tone request
13
Look up ringing tones
14
Select ringing tone
15
Download ringing tone
16
Add ringing tone to list

FIG. 3

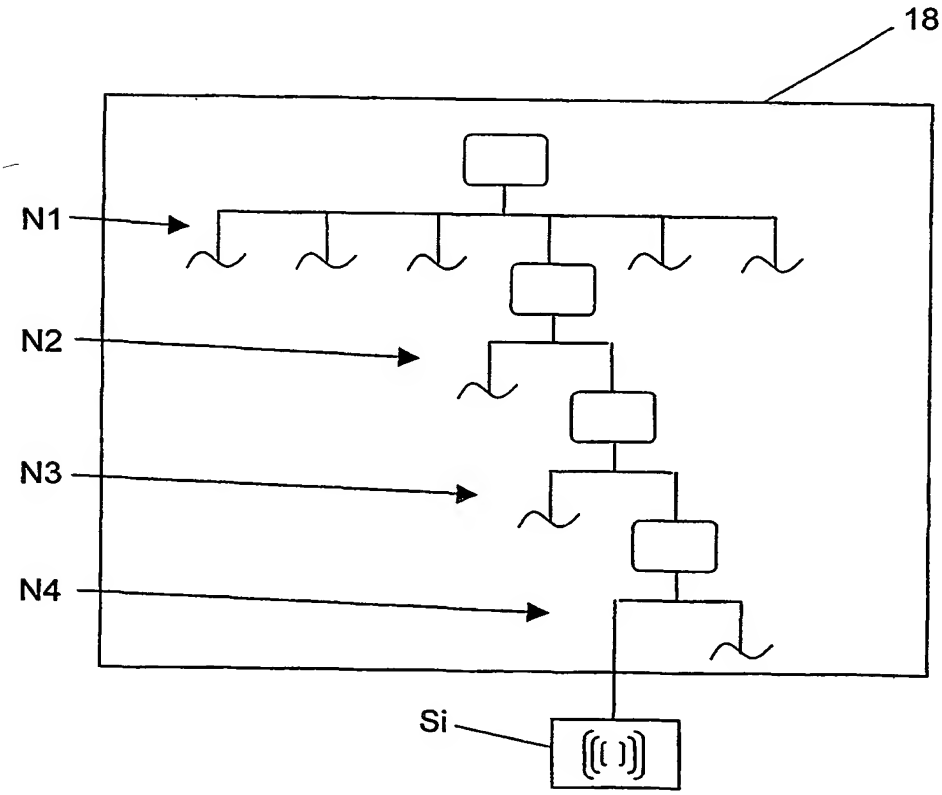
18
N1
N2
N3
N4
Si

FIG. 4

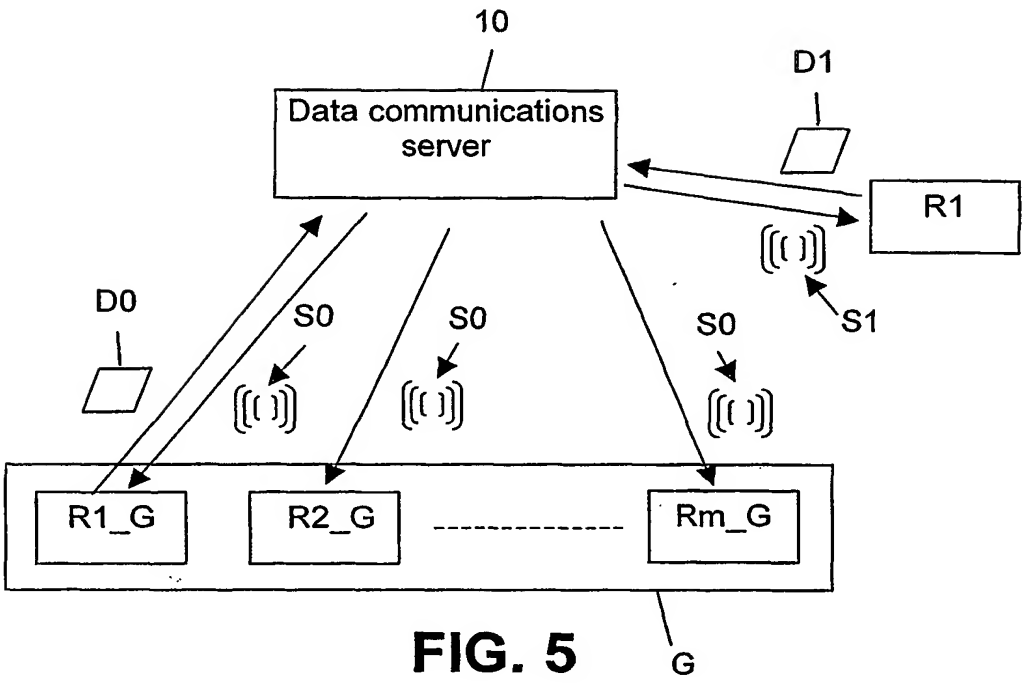

FIG. 5

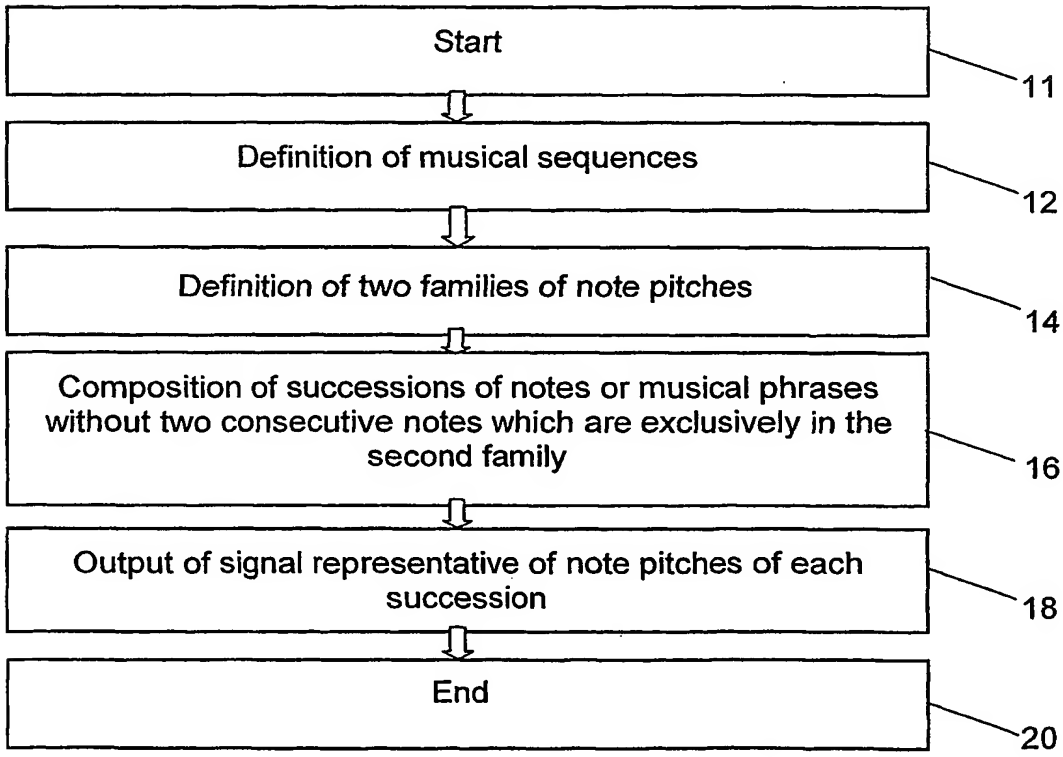

FIG. 6

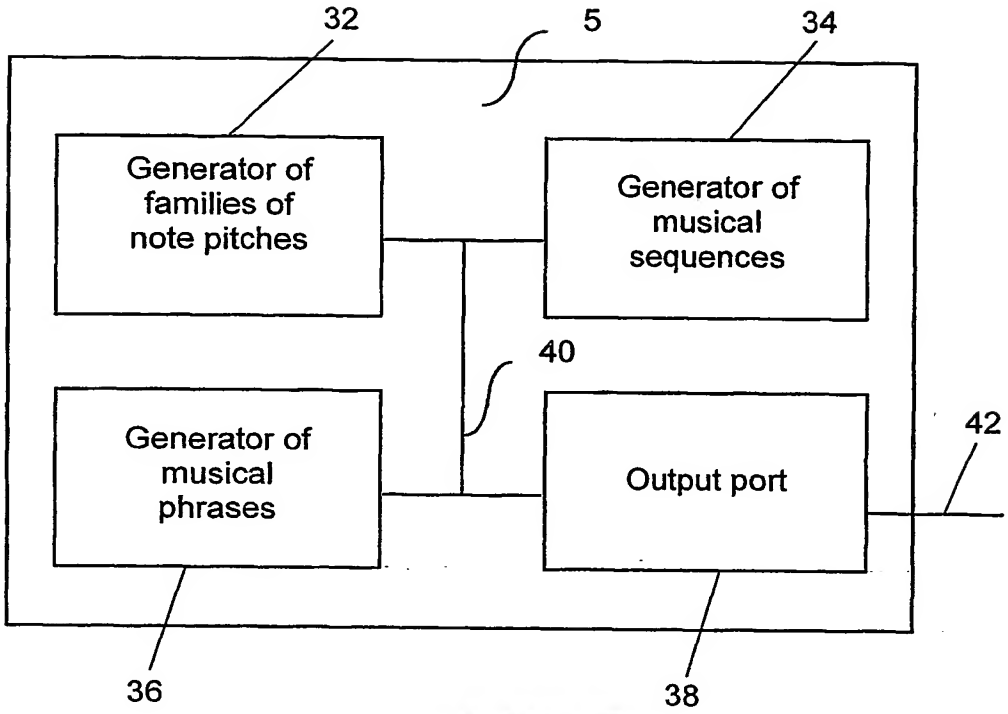

FIG. 7

INTERNATIONAL SEARCH REPORT

Inter ıl Application No
PCT/EP 02/01992

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M19/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 851 649 A (NOKIA MOBILE PHONES LTD) 1 July 1998 (1998-07-01) cited in the application abstract	1-14
A	WO 98 25397 A (PHILIPS ELECTRONICS NV ;PHILIPS NORDEN AB (SE)) 11 June 1998 (1998-06-11) abstract	1-14
A	US 5 481 599 A (MACALLISTER DONALD I ET AL) 2 January 1996 (1996-01-02) abstract	1-14

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the International search	Date of mailing of the international search report
18 June 2002	25/06/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Montalbano, F

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte ıl Application No
PCT/EP 02/01992

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			WO	9615611 A1	23-05-1996